

CLAIMS

1. A light guide for a surface light source device, having a plate-like shape, which guides light emitted from a point primary light source and which has a light incident end surface for receiving the light from the primary light source and a light outputting surface for outputting the guided light,

wherein a plurality of elongated concave/convex structures extending substantially along a direction of directivity of the light which has entered the light guide in a plane along the light outputting surface and arranged substantially in parallel to each other are formed on one of the light outputting surface and a back surface on an opposite side and, at least in the vicinity of the primary light source, a shape of a section of the plurality of elongated concave/convex structures in a plane perpendicular to extending directions thereof is such that an existence proportion of angle components of 20° or more and 50° or less of an absolute value of an inclination angle formed by a tangent in each micro area with an elongated concave/convex structure forming surface is 10% or more.

2. The light guide for the surface light source device according to claim 1, wherein each of the elongated concave/convex structures is elongated lens, and the plurality of elongated concave/convex structures are constituted of a plurality of repeatedly arranged elongated lenses having substantially the same shape.

3. The light guide for the surface light source device according to claim 1, wherein a part or all of the surface of each of the elongated concave/convex structures is roughened.

4. The light guide for the surface light source device according to claim 1, wherein the existence proportion of angle components of α° or more and $\alpha^\circ+10^\circ$ or less in the absolute value of the inclination angle is 60% or less with respect to all angles α° of 0° or more and 80° or less at least 5 in the vicinity of the primary light source.

5. The light guide for the surface light source device according to claim 1, wherein the elongated concave/convex structure forming surface has a region A which is positioned in the vicinity of the primary light 10 source and in which the elongated concave/convex structures are formed, and a region B which is positioned in the vicinity of the region A and in which the elongated concave/convex structures are formed, and a sectional shape of the region A is different from that of the region B.

15 6. The light guide for the surface light source device according to claim 5, wherein the existence proportion of angle components of 30° or more and 50° or less in the absolute value of the inclination angle in the region B is smaller than that in the region A.

20 7. The light guide for the surface light source device according to claim 5, wherein a valley portion inclination angle of the elongated concave/convex structures formed in the region B is smaller than that of the elongated concave/convex structures formed in the region A.

25 8. The light guide for the surface light source device according to claim 5, wherein a shape of the elongated concave/convex structures formed in the region B gradually changes depending on a position.

9. The light guide for the surface light source device according

to claim 5, wherein the region B is formed in a part or all of an end portion of an effective light emitting region in the vicinity of the primary light source.

5 10. The light guide for the surface light source device according to claim 5, wherein substantially all of the elongated concave/convex structure forming surface except the region A is the region B.

10 11. The light guide for the surface light source device according to claim 5, wherein the region B is formed in a band shape.

12. The light guide for the surface light source device according to claim 5, wherein the region B is formed in an island shape.

15 13. The light guide for the surface light source device according to claim 1, wherein the existence proportion of angle components of 35° or more and 60° or less in the absolute value of the inclination angle is 4% or more and 55% or less, or the existence proportion of angle components of 15° or less in the absolute value of the inclination angle is 25% or more and 20 85% or less at least in the vicinity of the primary light source.

14. The light guide for the surface light source device according to claim 1, wherein the sectional shape of all or a part of the elongated concave/convex structures is constituted of an outwardly convex curved line.

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15. The light guide for the surface light source device according to claim 1, wherein the sectional shape of all or a part of the elongated concave/convex structure is constituted of an outwardly concave curved line.

16. The light guide for the surface light source device according to claim 1, wherein the sectional shape of all or a part of the elongated concave/convex structure is constituted of a curved line having an outwardly convex region and an outward concave region.

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17. The light guide for the surface light source device according to claim 1, wherein the sectional shape of all or a part of the elongated concave/convex structure is a substantially polygonal shape.

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18. The light guide for the surface light source device according to claim 1, wherein the sectional shape of all or a part of the elongated concave/convex structure has a shape in which a straight line is combined with a curved line.

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19. The light guide for the surface light source device according to claim 1, wherein in the elongated concave/convex structure forming surface, a first region in which the elongated concave/convex structures each having curved line shape as the sectional shape are arranged is formed in the vicinity of the primary light source, and a second region in which 20 the elongated concave/convex structures each having substantially polygonal shapes as the sectional shapes are arranged is formed adjacent to the first region.

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20. The light guide for the surface light source device according to claim 19, wherein a maximum value of the existence proportion of angle components of α° or more and $\alpha^\circ+10^\circ$ or less in the absolute value of the inclination angle obtained with respect to all angles α° of 0° or more and 80° or less in the second region is larger than that in the first region.

21. The light guide for the surface light source device according to claim 1, wherein the elongated concave/convex structure forming surface is one obtained in such a manner that a part or all of an elongated concave/convex structure shape transfer surface of a mold is blasted, and
5 the elongated concave/convex structure shape transfer surface is transferred by forming using the mold.

22. The light guide for the surface light source device according to claim 1, wherein the elongated concave/convex structure forming surface is one obtained in such a manner that a part or all of an elongated concave/convex structure shape transfer surface of a mold is polished, and
10 the elongated concave/convex structure shape transfer surface is transferred by forming using the mold.

15 23. The light guide for the surface light source device according to claim 1, wherein the elongated concave/convex structure forming surface is one obtained in such a manner that a part or all of a elongated concave/convex structure shape transfer surface of a mold is etched, and the
concave/convex structure shape transfer surface is transferred by
20 forming using the mold.

24. The light guide for the surface light source device according to claim 1, wherein the elongated concave/convex structure forming surface has a blast trace in a part or all thereof.
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25. The light guide for the surface light source device according to claim 1, wherein the elongated concave/convex structure forming surface is one obtained in such a manner that a first elongated concave/convex structure shape transfer surface is transferred by forming using a first

mold having the first elongated concave/convex structure shape transfer surface to obtain a formed material, the surface obtained by blasting a part or all of the surface of the formed material corresponding to the first elongated concave/convex structure shape transfer surface is transferred to 5 obtain a second mold having a second elongated concave/convex structure shape transfer surface, and the second elongated concave/convex structure shape transfer surface is transferred by the forming using the second mold.

26. The light guide for the surface light source device according 10 to claim 1, wherein the light incident end surface is constituted of an anisotropic rough surface, and an average inclination angle of the anisotropic rough surface in a direction along the light outputting surface is larger than that in a direction perpendicular to the light outputting surface.

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27. The light guide for the surface light source device according to claim 26, wherein in the anisotropic rough surface, the average inclination angle in the direction along the light outputting surface is 3° to 30° , and the average inclination angle in the direction perpendicular to 20 the light outputting surface is 5° or less.

28. The light guide for the surface light source device according to claim 26, wherein in the anisotropic rough surface, a length of a region having an inclination angle of 8° or more with respect to an anisotropic 25 rough surface forming surface in measurement in a direction perpendicular to the light outputting surface is 5% or less of a total measured length.

29. The light guide for the surface light source device according to claim 26, wherein in the anisotropic rough surface, the surface of an

elongated lens extending in a direction perpendicular to the light outputting surface is roughened.

30. The light guide for the surface light source device according
5 to claim 1, wherein a light outputting functional structure is disposed in
at least one of the light outputting surface and the back surface and/or
inside the light guide.

31. The light guide for the surface light source device according
10 to claim 30, wherein the light outputting functional structure comprises a
rough surface or a plurality of substantially mutually parallel elongated
lenses formed on at least one of the light outputting surface and the back
surface, and the elongated lenses substantially extend in a direction of
directivity of light which has entered the light guide or a direction
15 perpendicular to the direction of directivity of light.

32. The light guide for the surface light source device according
to claim 31, wherein an average inclination angle of the plurality of
elongated lenses is 0.2° to 20° in the direction of the directivity of the
20 light which has entered the light guide.

33. The light guide for the surface light source device according
to claim 31, wherein the surfaces of the plurality of elongated lenses are
roughened.

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34. The light guide for the surface light source device according
to claim 30, wherein the light outputting functional structure comprises a
component in the light guide, whose refractive index is different from that
of a main component of the light guide inside.

35. The light guide for the surface light source device according to claim 1, wherein a necessary light spread angle is 100° or more and a region in which the existence proportion of angle components of 30° or more and 50° or less in the absolute value of the inclination angle is 10% or more is formed substantially in all of a region from the light incident end surface to an effective light emitting region in the elongated concave/convex structure forming surface.

10 36. The light guide for the surface light source device according to claim 1, wherein a necessary light spread angle is 90° or more and a region in which the existence proportion of angle components of 25° or more and 50° or less in the absolute value of the inclination angle is 20% or more is formed in a part or all of a region from the light incident end surface to an effective light emitting region in the elongated concave/convex structure forming surface.

20 37. The light guide for the surface light source device according to claim 1, wherein a necessary light spread angle is 80° or more and a region in which the existence proportion of angle components of 25° or more and 50° or less in the absolute value of the inclination angle is 10% or more is formed in a part or all of a region from the light incident end surface to an effective light emitting region in the elongated concave/convex structure forming surface.

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38. The light guide for the surface light source device according to claim 1, wherein a necessary light spread angle is 70° or more and a region in which the existence proportion of angle components of 20° or more and 50° or less in the absolute value of the inclination angle is 10% or

more is formed in a part or all of a region from the light incident end surface to an effective light emitting region in the elongated concave/convex structure forming surface.

5 39. The light guide for the surface light source device according to claim 1, wherein a plurality of obliquely elongated lenses extending in an oblique direction with respect to the direction of the directivity of the light which has entered the light guide are formed in the vicinity of an edge in which the light incident end surface is formed in the light
10 outputting surface or the back surface.

15 40. The light guide for the surface light source device according to claim 39, wherein the obliquely elongated lenses extend in a direction inclined at an angle corresponding to a half of a necessary light spread angle with respect to the direction of the directivity of the light which has entered the light guide.

20 41. The light guide for the surface light source device according to claim 39, wherein in a shape of a section perpendicular to the extending direction of the obliquely elongated lenses, the existence proportion of angle components of 20° or more and 50° or less in the absolute value of the inclination angle formed by a tangent of each micro region with the obliquely elongated lens forming surface is 10% or more.

25 42. A surface light source device comprising: a light guide for the surface light source device, according to any one of claims 1 to 41; the primary light source disposed adjacent to the light incident end surface of the light guide; and at least one light deflection element disposed adjacent to a light outputting surface of the light guide, the light deflection

element having a light entrance surface positioned facing the light outputting surface of the light guide, and a light exit surface on an opposite side, and comprising a plurality of elongated lenses extending in a direction substantially parallel to an incident end edge on which the light 5 incident end surface of the light guide is formed and extending in parallel to one another on the light entrance surface of the light deflection element adjacent to the light guide.

43. The surface light source device according to claim 42,
10 wherein each of the plurality of elongated lenses of the light entrance surface of the light deflection element comprises two surfaces, and totally reflects the light which has been incident on one of the surfaces by the other surface.

15 44. The surface light source device according to claim 42,
wherein a light reflection element is disposed facing the back surface of
the light guide.

20 45. The surface light source device according to claim 42,
wherein the light incident end surface is formed in one end edge or one corner portion of the light guide.

25 46. The surface light source device according to claim 45,
wherein a plurality of primary light sources are arranged at an interval adjacent to the one end edge or corner portion of the light guide, and a region in which the existence proportion of angle components of 30° or more and 50° or less in the absolute value of the inclination angle is 10% or more is disposed in the vicinity of the end edge of the light guide in such a manner that lights coming from the adjacent primary light sources are

superimposed upon each other in the region.

47. The surface light source device according to claim 45,
wherein a plurality of primary light sources are arranged at an interval
5 adjacent to the one end edge or corner portion of the light guide, and an
average inclination angle of a light outputting functional structure of the
light guide in a region of the front surface of the primary light source is
different from that in a region between the primary light sources.

10 48. The surface light source device according to claim 45,
wherein a plurality of primary light sources are arranged at an interval
adjacent to the one end edge or corner portion of the light guide and, when
only one of the primary light sources is turned on, normal luminance is
measured at an interval of 1 mm in a length direction of a 0.5 mm wide
15 region of 3 mm to 3.5 mm from the edge of an effective light emitting region
of the light guide on the side of the light incident end surface, and a
relation between a measurement position and the luminance is plotted, a
half-value width distance obtained is in a range of 0.8 time to 1.2 times
with respect to a distance between the adjacent primary light sources.